



Naval Open Architecture

Overview on the Enterprise Initiative



1 May 2006

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Open Architecture
PEO IWS 7.0B***



Today's presentation provides an overview on the Navy's OA Enterprise initiative and required changes to implement OA

Overview on the OA Initiative

- Challenges facing Navy Leadership
- Establishment of the OA Enterprise Team (OAET)
- The OA Strategy
- The OA Transformation Roadmap
- OA Measures to Gauge Success
- Benefits of OA



Navy leadership is under continued pressure to control the rising costs of weapon systems and platforms...

“Among the greatest risks we face is the spiraling cost of procurement for modern military systems, and shipbuilding is no exception. Shipbuilding cost increases have grown beyond our ability to control as compared to decades prior.”

— Former CNO, ADM Clark, Statement Before the Senate Armed Services Committee, 10 February 2005

“The Committee is concerned over the affordability of the Navy’s future shipbuilding program. The Committee encourages the Navy to redouble its efforts to lower costs for ship classes on the drawing boards, to provide a more affordable plan for the future.”

- Report of the Committee on the DOD Appropriations Bill, 2006, 10 June 2005

“Cost increases incurred while developing new weapon systems mean DOD cannot produce as many of those weapons as intended nor can it be relied on to deliver to the warfighter when promised. We must either make tough decisions now to increase the chances for programs to be executable within fiscal realities or brace ourselves for more draconian decisions later driven by those fiscal realities.”

- DOD Acquisition Outcomes, A Case for Change, Statement of Katherine V. Schinasi, Managing Acquisition and Sourcing Management, GAO, 15 Nov 2005

...and meet the needs of the warfighter



In July 2005, incoming Chief of Naval Operations, ADM Mullen vowed to continue transforming the Navy



"In almost every conceivable way, we are not the same Navy we were five years ago. We don't think the same; we don't plan the same; we don't operate the same or fight the same."

By adapting to new technology and new ways of doing business, the Navy is now more capable, more ready, more effective and more efficient. The only constant in our future is change...change will demand hard work and the willingness to adapt.

We must continue to sharpen the blade that is naval warfare, both at sea and ashore. Though we are clearly more ready today than we have ever been, we have much work yet to do and effort yet to expend to be ready for tomorrow. We must be able to transform ourselves and our thinking quickly in response to an ever-changing, ever-challenging and ever-more-joint environment. Much is riding on that ability."

– Chief of Naval Operations, ADM Mullen, July 2005

Source: http://www.defenselink.mil/news/Jul2005/20050722_2192.html, "Leaders Encourage New CNO to Continue Navy's Transformation," by Donna Miles



Implementation of open architecture across the Navy, is and will remain, a key tenet of transformation...

NAVAL OPEN ARCHITECTURE

***A multi-faceted strategy
providing a framework
for developing joint
interoperable systems
that adapt and exploit
open-system design
principles and
architectures***

NAVAL OA CORE PRINCIPLES

***Modular design and design
disclosure***

Reusable application software

***Interoperable joint warfighting
applications and secure
information exchange***

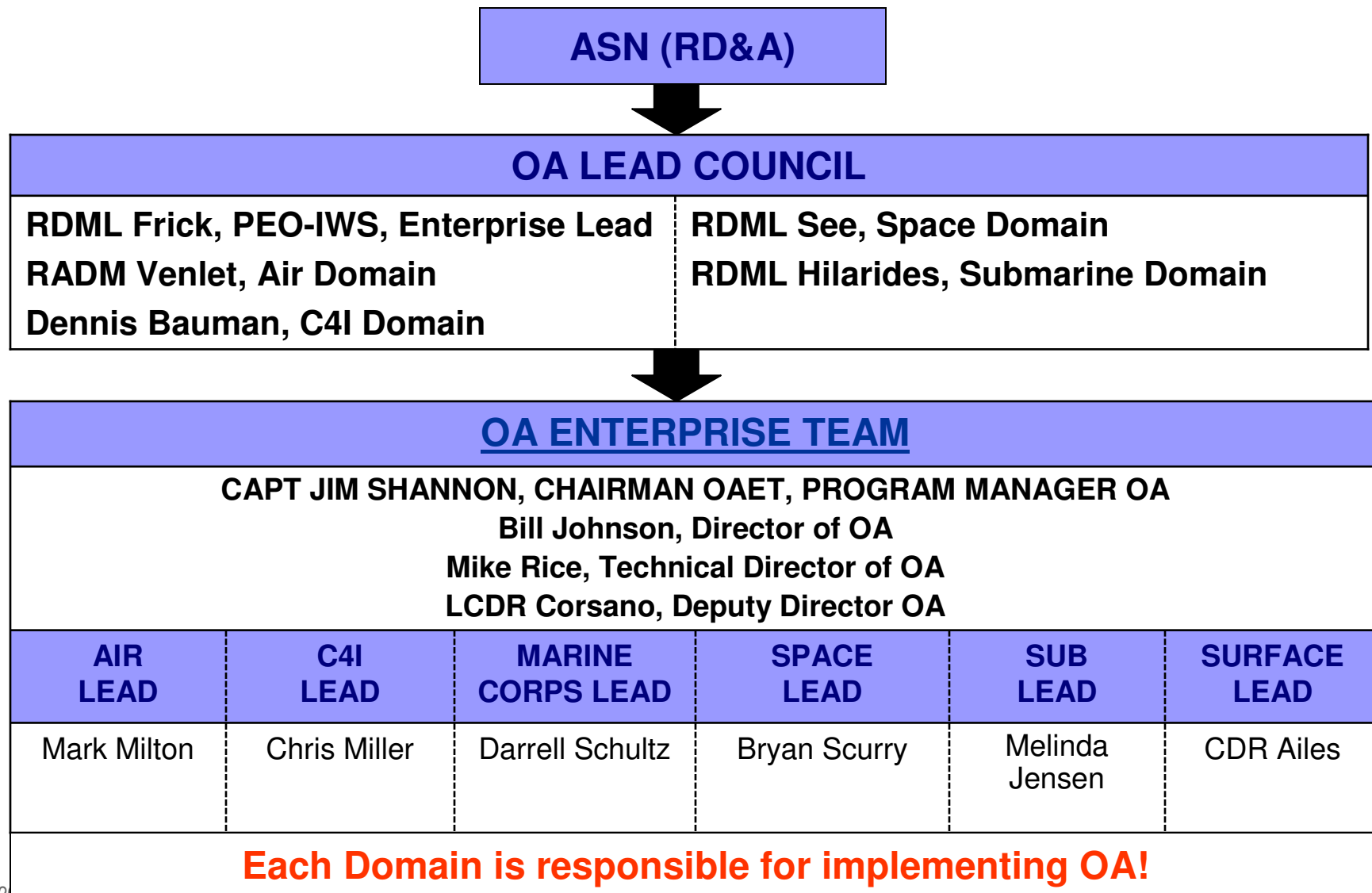
Life cycle affordability

***Encouraging competition and
collaboration***

...that will help drive costs down while increasing capabilities



In August 2004, leadership established the Naval Open Architecture Enterprise Team to drive the overall OA strategy





In developing the OA strategy, it is important to understand where we are today...

Today's Environment:

■ Business

- Continuously challenged with budgetary decisions
- Inflexible acquisition strategies that “lock the Navy in”
- Limited competition that impede innovation
- Procure systems that are not affordable in production and modernization
- Procure systems for similar capabilities across the enterprise
- Limited software reuse across programs or domains
- Limited access and sharing of data across programs or domains
- Few enterprise processes to foster integration among programs and domains

■ Technical

- Incompatible systems that are not interoperable
- Monolithic or closed systems that are not rapidly or economically upgradeable
- Closed systems that cannot leverage advances in technology
- Special use code and system modules that cannot be reused across the Navy



...and where we want to go – Our Future State

Future State Environment:

■ Business

- Enterprise-wide plans based on cost/capability analysis of programs that address capability, affordability and stabilization
- Flexible acquisition strategies and contracts that enable the Navy to reuse software, easily upgrade systems and share data among the enterprise
- Streamlined investments in similar capabilities
- Increased competition to foster innovation and leverage tech refreshes
- Established enterprise processes and governance to foster integration

■ Technical

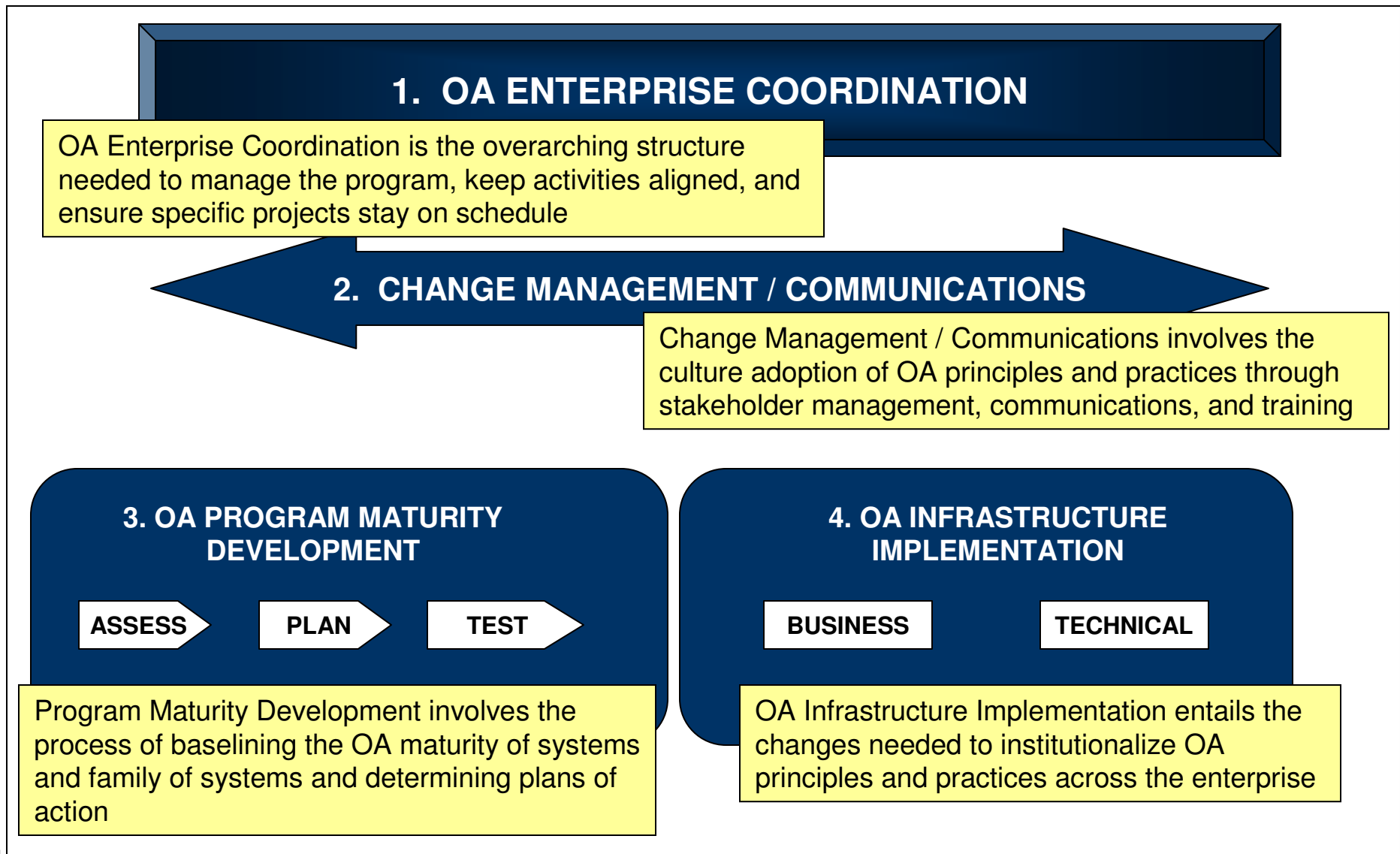
- Layered and modular open architectures that address portability, maintainability, interoperability, upgradeability and long-term supportability
- Modular, open designs consisting of components that are self-contained elements with well-defined interfaces
- Maximum use of commercial standards and commodity COTS products
- Continuously conform with Information Assurance (IA) requirements and monitor technology developments for IA improvements

The driving energy for OA is competition!



Our OA Roadmap is our plan for reaching our end-state

OA Transformation Roadmap





Component 1 involves coordinating the transformation across the Naval Enterprise and with other services

1. OA ENTERPRISE COORDINATION

FY 06 ACTIVITIES

1.1 Execute OA Strategy

- Execute ASN (RD&A) OA vision
- Execute OPNAV OA requirements
- Execute OA EXCOMM Action Items
- Build FY06 Master Integrated Plan

1.2 Support ASN (RD&A) / OA Lead Council

- Support OA EXCOMM Meetings
- Submit Monthly OA Metrics/ Reports

1.3 Manage OA Enterprise Team (OAET)

- Conduct OAET Monthly Meetings
- Conduct Quarterly Program Reviews
- Manage OAET Integrated Workplan
- Manage FY 06 OA Budget
- Manage OAET Risk Plan

1.4 Coordinate OA Initiative with FORCEnet

- Attend FORCEnet EXCOMM Meetings
- Participate in C4I Virtual Syscom
- Align tasks, where applicable

1.5 Coordinate Naval OA Initiative with Other Services

- Coordinate with OSD, OSJTF
- Coordinate with Marine Corps
- Coordinate with Army
- Coordinate with Air Force



Component 2 includes managing change and communications with our stakeholders

2. CHANGE MANAGEMENT / COMMUNICATIONS

FY06 ACTIVITIES

2.1 Manage OAET Stakeholder Plan

- Update Stakeholder Plan
- Conduct Assessments
- Develop Mitigating Action Plans
- Execute Action Plans

2.2 Manage Ongoing Communications

- OA Briefs
- OA Precepts
- [OA Quick Successes](#)
- [Acc.dau.mil/oa website](http://Acc.dau.mil/oa)
- Correspondence
- Communications Plan

2.3 Manage Ongoing Outreach Efforts

- [OA Industry Days](#)
- [OA Symposiums](#)
- OA Road Shows
- Conferences
- Industry Consortia

2.4 Execute OA Enterprise [Education and Training Master Plan](#)

- Develop / field curricula for NPS & DAU
- Develop Continuous Learning modules / Workforce Awareness programs



Component 3 entails assessing the openness of programs, updating programs of record, and testing alternatives

3. OA PROGRAM MATURITY DEVELOPMENT

ASSESS

PLAN

TEST

FY 06 ACTIVITIES

3.1 Maintain analytical tools to assess programs

3.2 [Conduct OA Program Assessments](#)

3.3 Adjudicate Results of OA Assessments

3.4 Determine Business and Technical Alternatives

3.5 Identify Enterprise Components for Re-Use

3.6 Prepare POM Issue Papers and/or Business Case (s)

- ☐ Costs / Benefits
- ☐ Risk Assessment

3.7 Update Program of Record

- ☐ Adjust funding to support plan

3.8 [Test OA Technical Alternatives](#) for Risk Reduction

- ☐ Feasibility Testing
- ☐ Developmental Testing



Component 4 requires changing the business and technical landscape to support the implementation of OA

4. OA INFRASTRUCTURE IMPLEMENTATION

BUSINESS

TECHNICAL

BUSINESS

- 4.1 Assess prime integrator vs. end-to-end developer roles
- 4.2 Develop [enterprise OA contract language](#)
- 4.3 Establish process for conducting data rights requirements analysis
- 4.4 Develop framework for OA contract incentives
- 4.5 Develop OA Award fee criteria



TECHNICAL

- 4.6 Develop [OA Enterprise Component Library](#)
 - Inventory existing repositories
 - Develop ConOps and CM processes
 - Define data structures and technical detail
 - Identify OA Artifacts
 - Build, deploy and populate repository and toolset
- 4.7 [Align Domain standards](#)
- 4.8 Align standards to DISR



Successful implementation of OA requires sound performance measures to monitor and gauge success

ILLUSTRATIVE PERFORMANCE MEASURES	
OA Metric	■ OA metric illustrating a program's current state of openness
Time to Field	■ Decreased time to field new warfighting capabilities to the fleet
Cost Avoidance	■ Cost avoidance from software re-use and use of COTS
Baseline Reduction	■ Reduction of warfare system baselines
Streamlined Investments	■ Streamlined investments for similar capabilities, system upgrades, test and evaluation



Implementation of OA will yield many benefits to the Navy as demonstrated by the ASW community

	Benefits to the Fleet and Other Organizations
Performance	<ul style="list-style-type: none">■ Continuous competition yields best of breed applications■ Focus on warfighter priorities
Schedule	<ul style="list-style-type: none">■ System integration of OA-compliant software happens quickly■ Rapid update deliveries driven by use operational cycles
Cost Avoidance Mechanisms	<ul style="list-style-type: none">■ Software – Develop once, use often, upgrade as required■ Hardware – Use high-volume COTS products at optimum price points■ Training systems use same tactical applications and COTS hardware
Design for Maintenance-Free Operating Periods	<ul style="list-style-type: none">■ Install adequate processing power to support “fail-over” without maintenance■ Schedule replacement with improved COTS vice maintaining old hardware■ Reduce maintenance training required■ Consolidate Development and Operational Testing for reused applications
Risk Reduction	<ul style="list-style-type: none">■ Field new applications only when mature■ Do not force the last ounce of performance■ Deploy less (but still better than existing) performance or wait until next update



In summary, OA will continue to be a key enabler in meeting the three priorities laid out by the CNO for FY06...

U.S. NAVY MISSION

Combat-ready naval forces capable of winning wars, deterring aggression, preserving freedom of the seas, and promoting peace and security.

Sustain combat readiness

SEA POWER 21

FLEET RESPONSE PLAN

Build a fleet for the future

SHIPBUILDING PLAN

ASHORE VISION

AVIATION ROADMAP

Develop 21st century leaders

SEA WARRIOR

STRATEGY FOR OUR PEOPLE

DIVERSITY

OPEN ARCHITECTURE

...and several related objectives

CNO Guidance for 2006
Meeting the Challenge of a New Era

I. Introduction

We are a nation and a Navy at war. Whether providing sovereign deck space from which to launch strikes in Afghanistan, continuing to support ground operations in Iraq, patrolling the seas to interdict terrorists, or shaping the maritime domain through swift humanitarian action in Indonesia and on our own Gulf Coast, we are contributing to joint and combined operations in ways no one could have imagined a few short years ago.

We live on the cusp of a new era. It is an era plagued by uncertainty and change and unrestricted warfare, an era of shifting global threats and challenging new opportunities. It is an era that calls for new skill sets, deeper partnerships, mutual understanding and -- with the great majority of international commerce still moving on

2006 Key Objectives

1. Win the war on terror and stay ready to meet other operational requirements;
2. Determine and deliver on the Navy's future force structure requirements;
3. Drive to execution Sea Warrior and other ongoing manpower and personnel transformational efforts;
4. With the USMC, increase the value of naval contributions to the Joint Force;
5. Develop closer working relationships with the USCG and other governmental and non-governmental organizations;
6. Apply effects-based thinking across the Navy; and
7. Become leaders of change and innovation.





The Open Architecture Enterprise Team Points of Contact

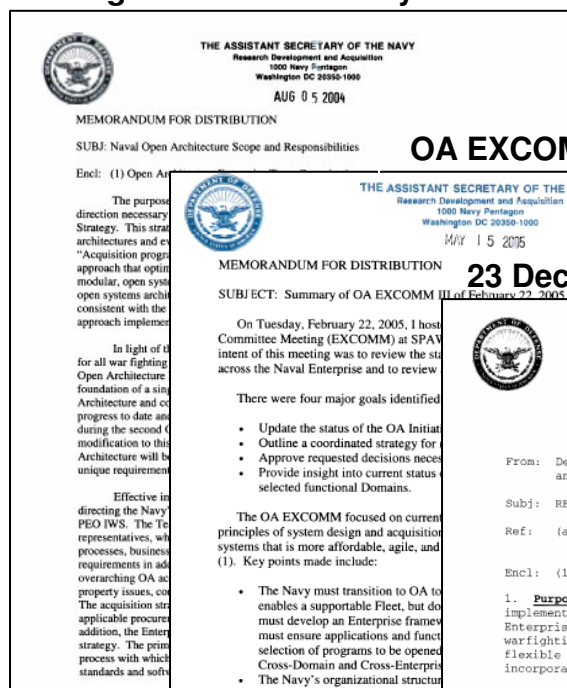
ENTERPRISE		
Bill Johnson	Director of OA	william.m.johnson4@navy.mil
Mike Rice	Technical Director OA	michael.l.rice@navy.mil
LCDR Corsano	Deputy Director OA	Scott.Corsano@navy.mil
AIR DOMAIN		
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Brian Schneider	Air Domain Representative	brian.schneider@jhuapl.edu
C4I DOMAIN		
Chris Miller	C4I Domain Lead	chris.miller@navy.mil
Dave Gedra	C4I Domain Representative	dgedra@systechtechnologies.com
MARINE CORP DOMAIN		
Darrell Schultz	Marine Corp Lead	darrell.p.schultz@usmc.mil
Jim Africa	Marine Corp Representative	james.africa@navy.mil
SPACE DOMAIN		
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Carlos Del Toro	Space Domain Representative	cdeltoro@sbgtechnologiesolutions.com
SUB DOMAIN		
Melinda Jensen	Sub Domain Lead	melinda.jensen@navy.mil
Paul Gooder	Sub Domain Representative	pgooder@egginc.com
SURFACE DOMAIN		
CDR Ailes	Surface Domain Lead	john.ailes@navy.mil
Aaron Anderson	Surface Domain Representative	aaron.s.anderson@navy.mil



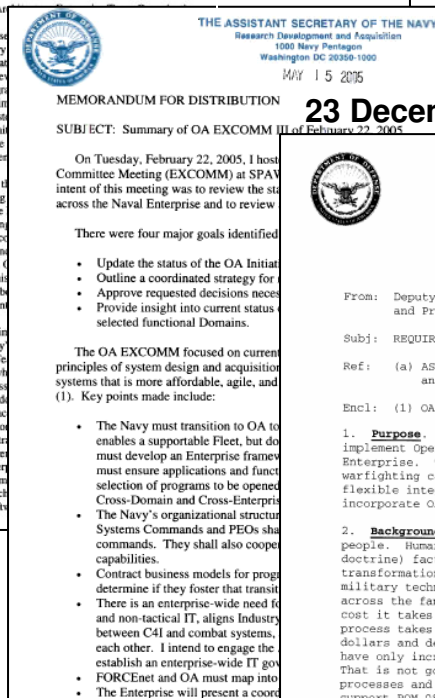


Naval OA requirements and program responsibilities are derived from three primary sources

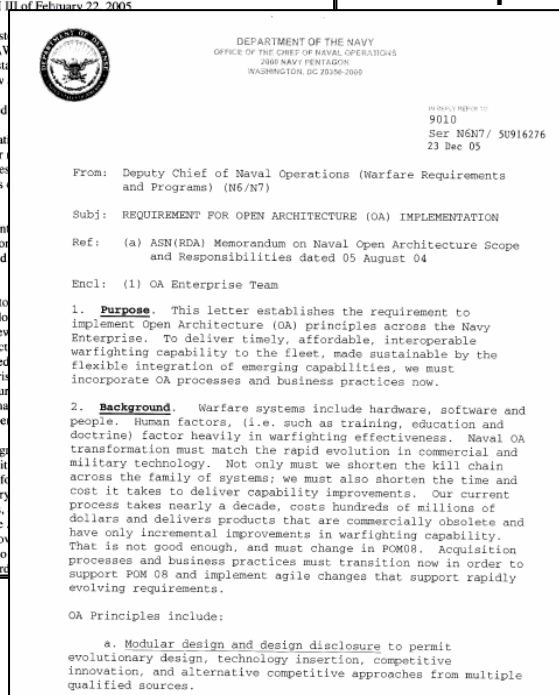
5 August 2004 OA Policy Statement



OA EXCOMM Action Items



23 December 2005 OPNAV Requirements



ASN RD&A OA Policy

OA EXCOMM Action Items

OPNAV Requirements

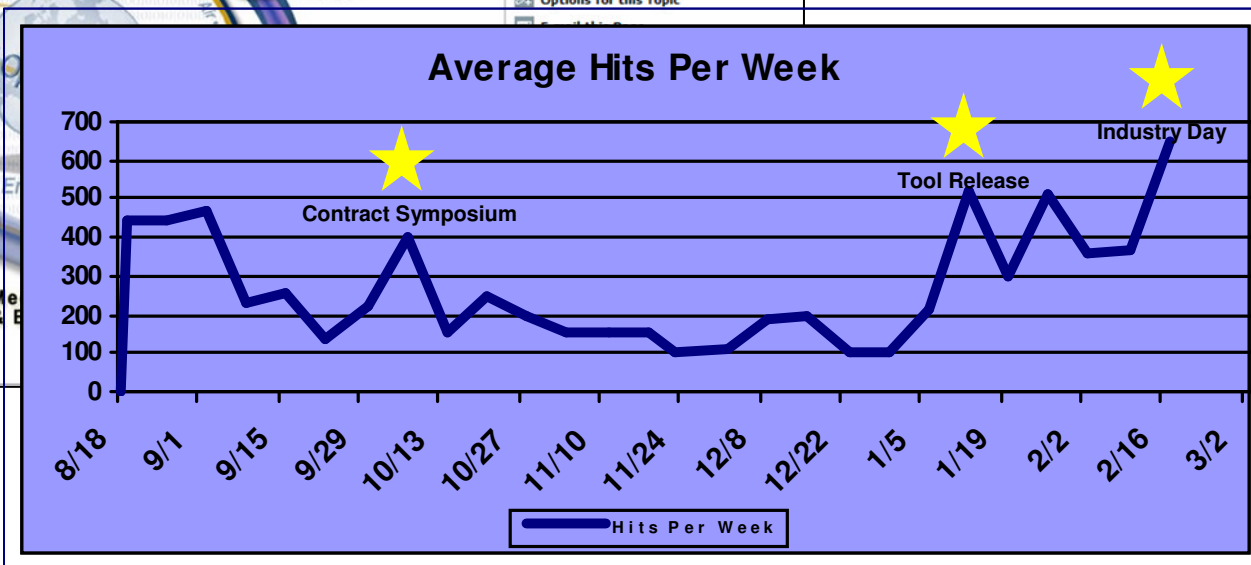
NAVAL OA Responsibilities and Requirements to execute against the strategy



OA Special Interest Area - <https://acc.dau.mil/oa>

The screenshot shows the 'Acquisition Community Connection' website. The header includes the site name, tagline 'Where the AT&I Workforce Meets to Share Knowledge', and the 'Defense Acquisition University' logo. A navigation bar contains links like 'Home', 'DAU Resources', 'Contact Us', 'Site Map', and 'Help'. A search bar is also present. The main content area is titled 'Naval Enterprise Open Architecture' and includes a description: 'The homepage for Navy acquisition professionals, industry, academia, and others interested in Naval Open Architecture.' It also shows a 'What's New' section with a circular diagram and a 'Tools' section with a 'Search Conversations' button. A sidebar on the right contains a login form and a 'PARTICIPATE' section.

Monthly average
hits ~ 1500

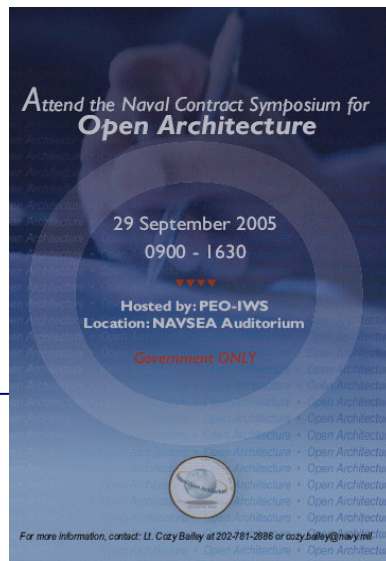




Symposiums and Industry Day Events

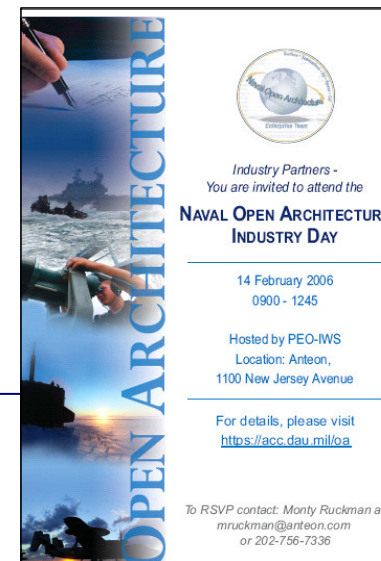
Naval OA Contract Symposium

- Held 29 September 05
- All day government event
- Focus: Contracting in OA
- 15 Speakers
- 125 Participants
- 60% response rate on survey



Naval OA Industry Day

- Held 14 February 06
- Half day industry event
- Focus: Business Principles of OA
- 8 Speakers
- 280 Participants
- 69% response rate on survey





Education and Training Master Plan



NPS / AFIT/ Civilian Universities

Postgraduate Education

- High Impact
- Long time horizon
- Develops leaders of tomorrow
- Technical competencies
- Some business competency
- In-depth education in technical or business disciplines leading to a graduate degree
- Formal classroom training, either on campus or distance learning

DAWIA Certification Training

- High Impact
- Long Time Horizon
- Qualification training for the Acquisition Workforce
- Principally business competencies
- Some technical competencies
- Broad training covering a variety of topics leading to career field certifications in specific disciplines
- Formal classroom training either on campus or distance learning

DAU

NAVY

Continuous Learning

- Medium Impact
- Short to medium time horizon
- Business or technical competencies
- Focused course work on specific topics
- Symposia and professional society meetings
- Instructor or web delivery

Knowledge Sharing

- Medium to high impact
- Short time horizon
- Task based
- Web based
- Learning modules or best practices

Workforce Awareness

- Low Impact
- Short time horizon
- Business orientation
- Briefings and general orientation
- Instructor or web delivery

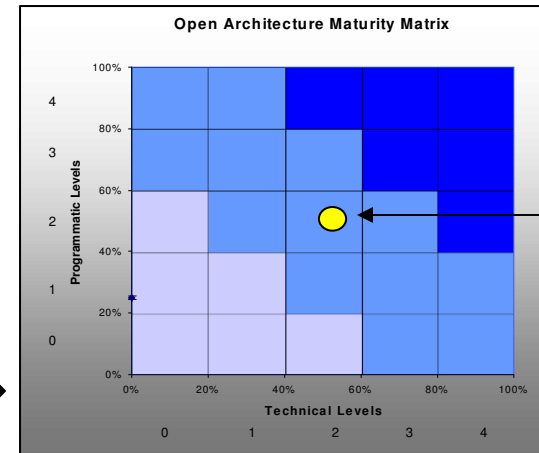
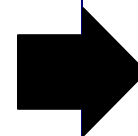




OA program assessments are underway to better understand how open our programs are today

■ Background

- EXCOMM II and EXCOMM IV tasked Program Managers to conduct program assessments to determine how open programs are today
- The OA Model and Tool were developed to support this action
- An assessment will produce an OA Metric and give managers a better understanding what they can do to increase the openness of their program



OA Metric

OA Assessment Report

Naval Open Architecture Assessment Tool
Assessment Score Summary

Program Name:					
Unit of Assessment:					
Acquisition Milestone:					
Next Review Date: 10/1000					

Area or Section	Total Questions Applicable	Total Questions Not Applicable	Max Score	Achieved	Normalized
A Open Systems Approach	2	0	8	2	25.0%
B Open Architectures	2	0	8	2	25.0%
C Open Hardware Design	2	0	12	3	25.0%
D Open Software Design and Management	4	0	16	4	25.0%
E Treatment of Proprietary Elements	4	0	16	4	25.0%
F Open Software Practices	4	0	16	4	25.0%
G Open Software Rights	2	0	12	3	25.0%
H Technical Interactions	4	0	16	4	25.0%
I Commercial Standards	1	0	4	1	25.0%
J Compliance	0	0	0	0	25.0%
Combined Programmatic Rating	20	0	100	25	25.0%
K Design Team: Interoperability	6	0	24	6	8.3%
L Design Team: Maintainability	2	0	8	0	0.0%
M Design Team: Extensibility	2	0	12	0	0.0%
N Design Team: Configurability	2	0	8	0	0.0%
O Design Team: Reusability	4	0	16	0	0.0%
P General Design Teams	1	0	4	0	0.0%
Combined Technical Rating	15	0	76	0	0.0%
Total Qualitative Rating		Implementation Not Applicable			

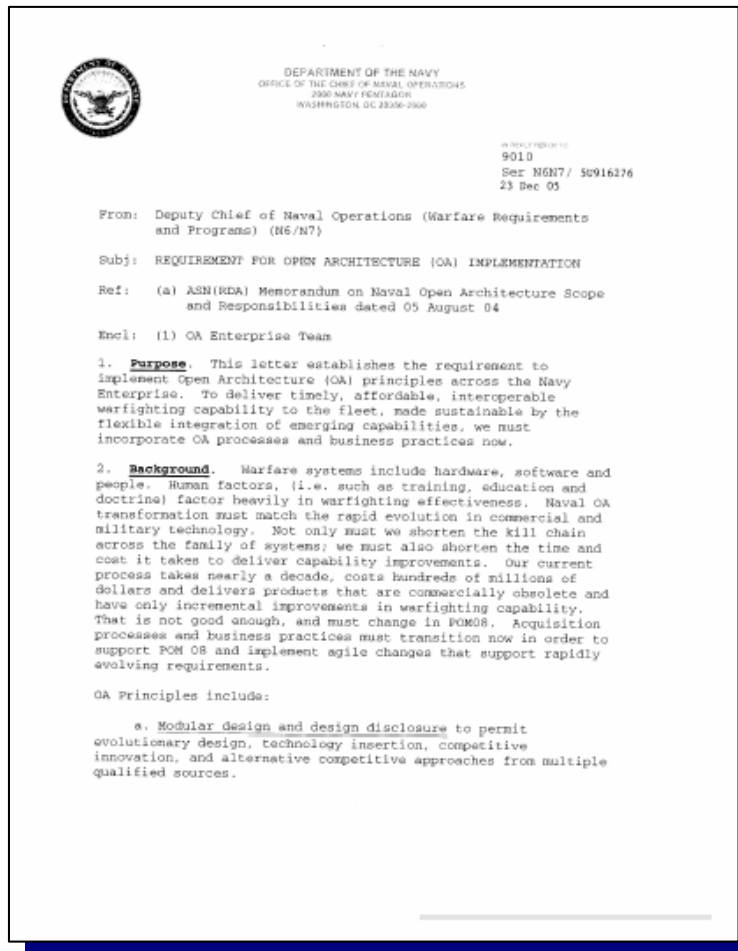
Quick start / About OAAT / Feedback / Assessment Information / **Technical Questions** / Programmatic Questions / Total





OA experimentation efforts

23 December 05 OA Experimentation Requirement



■ OA Experimentation Vision

- Develop rapid fielding and more affordable Warfighting capabilities
- The path to FORCEnet demands seamless integration
 - Reducing the risk of delivering non-Interoperable products

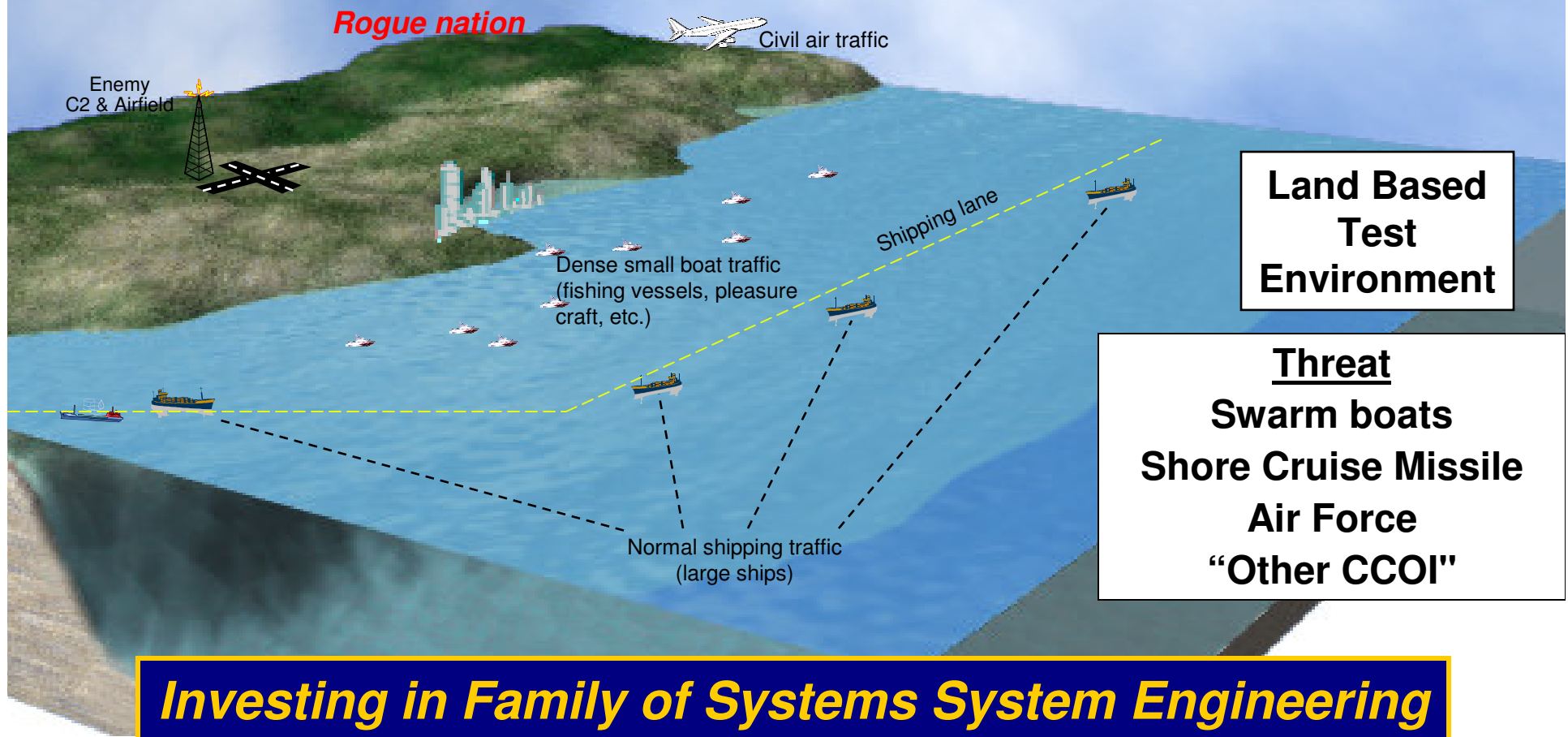
■ Experimentation Success Criteria

- Coordinate end-to-end force level system engineering experiments
 - Interoperability, Open Architecture
- Leverage existing open/collaborative engineering environments
 - Across systems and domains
- Foster team work
- Prototype new business and engineering processes

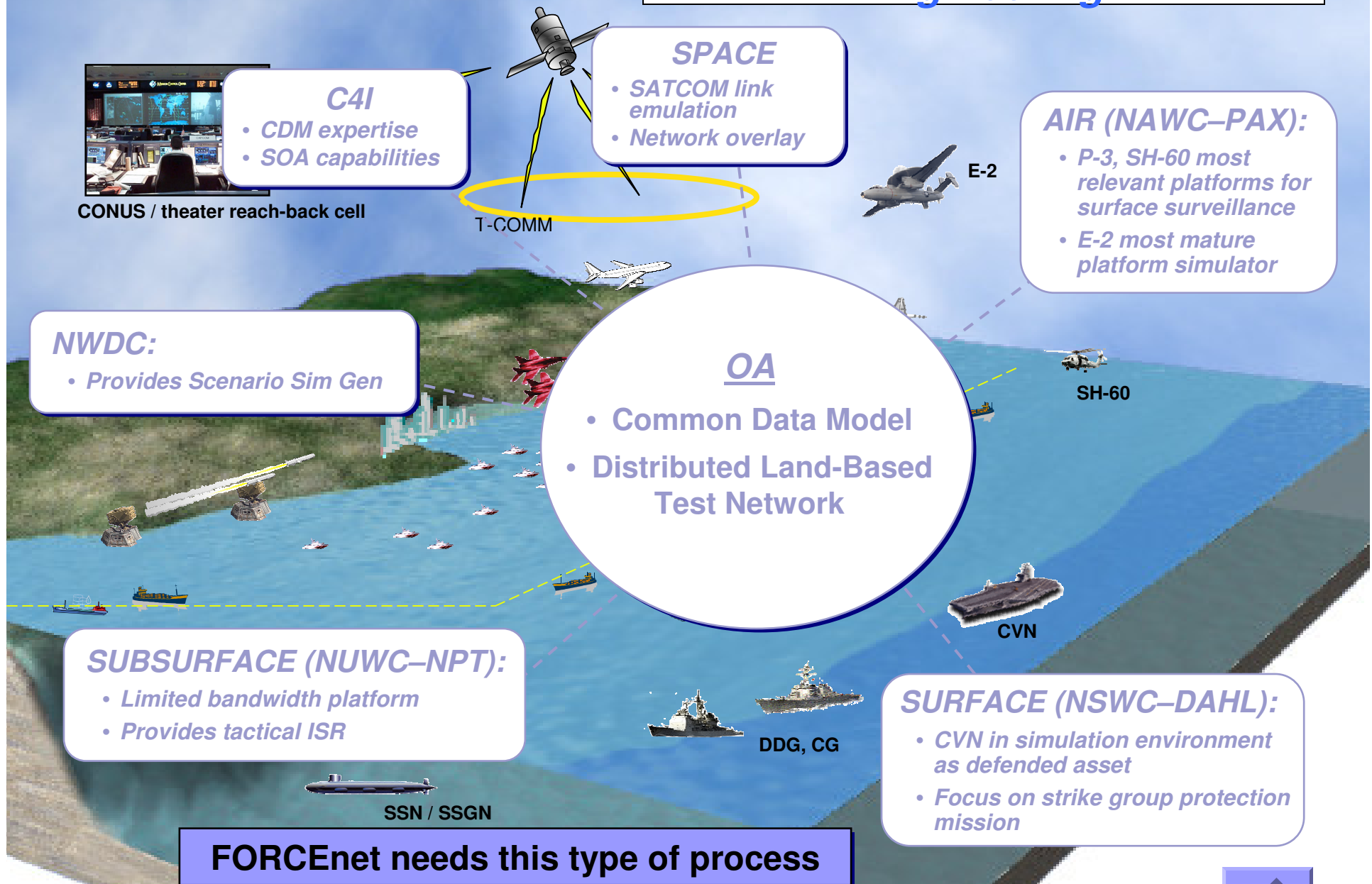
The following slides provide a test overview

ENVIRONMENT

- Littoral waters off the coast of a rogue nation that has tried to purchase sensitive material and has severed diplomatic ties to the U.S.
- High background of normal commercial maritime and air traffic



Family of Systems System Engineering





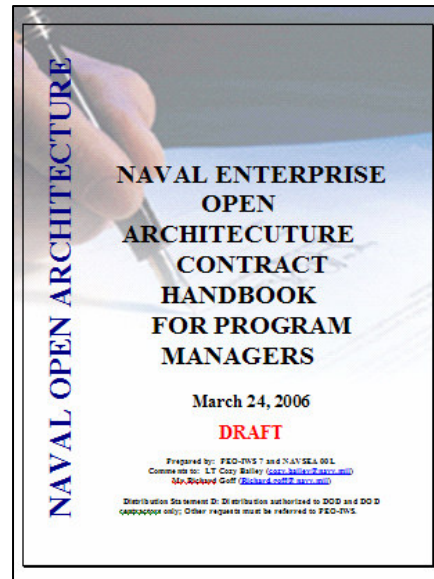
We have completed an initial OA Contract Handbook and accompanying implementation plan ...

Tasking

The Enterprise Team shall define an OA Acquisition strategy and develop guidance....The accompany guidance will then be utilized in future OA procurements tailored as necessary to incorporate domain specific requirements.

- Naval OA Policy Statement 05, Aug 2004

Draft Handbook



Implementation Plan

Build Awareness and Obtain Leadership Sponsorship

Issue OA Contract Guidebook V 1.0

Conduct Training on OA Guidebook

Conduct Pilot in NAVSEA Contracts

Institute Feedback Mechanisms
"Build-Test-Build"

Conduct Progress Evaluations

Communicate

" Until contracts include OA language, incentives, and award fees under the new paradigm, things will not change" - Quote from Industry Day participant

... per ASN RD&A tasking to utilize guidance in procurements





Enterprise Component Library

ILLUSTRATIVE EXAMPLE

Goal: Establish the Enterprise Asset Repository to store the reusable components per EXCOMM action and OPNAV requirement

Focus:

- What should the configuration management processes be to modify or update a reusable component?
- What artifacts should be stored in the repository?
- What technology and tools are needed to develop and build the asset repository?
- Should the repository be virtual or physical?
- How will the repository link to domain repositories?





Navy Technical Standards Alignment

Air



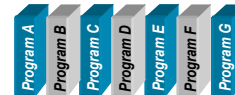
Surface



Submarine



C4I / Space



(Common Standards Profiles)

Navy Standards Working Group

DoD Standards (DISR)

Commercial Computing Industry Standards

(OMG) (POSIX) (IEEE) (W3C) (OASIS) (IETF)

**GIG &
Net Centric Standards**